4. (twice amended) A plasma etching system in accordance with claim 1, wherein the electromagnetic field generated by the electromagnetic field generating means to generate plasma has intensity satisfying a condition for electron cyclotron resonance between the planar plate and the sample.

5. (twice amended) A plasma etching system in accordance with claim 1, wherein the means for controlling reaction between the surface of the planar plate and the

C1 cont

plasma is means for superposing an electromagnetic wave of a second frequency onto the planar plate, the electromagnetic wave being different from the electromagnetic wave of a frequency ranging from 300 MHz 500 MHz.

6. (twice amended) A plasma etching system in accordance with claim 1, wherein the means of controlling reaction between the surface of the planar plate and the plasma is means for controlling temperature of the planar plate.

7. (twice amended) A plasma etching system in accordance with claim 5, wherein the means for controlling reaction between the surface of the planar plate and the plasma is means for superposing an electromagnetic wave of a second frequency onto the planar plate, the electromagnetic wave being different from the electromagnetic wave of a frequency ranging from 300 MHz 500 MHz and the means of

controlling reaction between the surface of the planar plate and the plasma is means for controlling temperature of the planar plate.

8. (twice amended) A plasma etching system in accordance with claim 5, wherein:

the second frequency of the electromagnetic wave superposed to the planar plate ranges from 50 kHz to 30 MHz; and

the frequency applied to the planar plate has power of 0.05 W/cm^2 to 5 W/cm^2.

C1 cont

9. (twice amended) A plasma etching system in accordance with claim 1, wherein:

the planar plate includes a plurality of holes; and

the source material gas is supplied through the holes.

10. (twice amended) A plasma etching system in accordance with claim 1, wherein the planar plate includes a surface to be brought into contact with the plasma,

the surface being made of silicon, carbon, silicon carbide, quartz, aluminum oxide, or aluminum.

11. (twice amended) A plasma etching system in accordance with claim 6, wherein the means for controlling temperature of the planar plate controls the temperature by circulating a liquid of which temperature is controlled in the planar plate.

12. (twice amended) A plasma etching system in accordance with claim 10, wherein the gas supplying means is arranged at a position in the vacuum chamber,

C1 cont

the position is at an inner position of the vacuum chamber relative to the material surface arranged on the surface of the planar plate to be brought into contact with the plasma.

14. (twice amended) A plasma etching system in accordance with claim 1, wherein the ring-shaped member includes a surface to be brought into the plasma,

C2

the surface being made of silicon, carbon, silicon carbide, quartz, aluminum oxide, or aluminum.

15. (twice amended) A plasma etching system in accordance with claim 1, wherein the ring-shaped member is applied with high-frequency power.

16. (twice amended) A plasma etching system in accordance with claim 15, further including a member to apply high-frequency power to the ring-shaped member, wherein

the power applying member is so configured to separate part of the high-frequency power applied to the sample to apply the part to the ring-shaped member.

17. (twice amended) A plasma etching system in accordance with claim 1, wherein means for reducing variation

in time of radicals incident to the sample is a wall of the vacuum chamber and the planar plate and means for control of temperature of the ring-shaped member.

18. (twice amended) A plasma etching system in accordance with claim 14, wherein the ring-shaped member has a height ranging from 0 mm to 40 mm relative to the sample surface in a direction vertical to the sample surface.

C2 cont

19. (twice amended) A plasma etching system in accordance with claim 14, wherein the ring-shaped member has a width ranging from 20 mm to the distance between the planar plate and the sample in a direction horizontal to the sample surface.

20. (twice amended) A plasma etching system in accordance with claim 16, wherein the member to apply high-frequency power to the ring-shaped member and to separate part of the high-frequency power applied to the sample is a capacitor or has a function of a capacitor.

21. (twice amended) A plasma etching system in accordance with claim 1, wherein the planar plate to supply an electromagnetic wave into the vacuum chamber is coupled via a dielectric substance to a plate at an earth potential.

22. (twice amended) A plasma etching system in accordance with claim 1, wherein:

the planar plate has a shape of a disk;

the planar plate has a central section connected to a conductor in a shape of a circular cone; and

the planar plate supplies the electromagnetic wave via the conductor.

Sub B3

23. (twice amended) A plasma etching system in accordance with claim 17, wherein:

the means for controlling temperature of the vacuum chamber, the planar plate, and the ring-shaped member controls the temperature by circulating a liquid of which temperature is controlled; and

the temperature controlled ranges from 20°C to 140°C.

C7 cont

24. (twice amended) A plasma etching system in accordance with claim 1, wherein the magnetic field generated by the magnetic field generating means has magnetic lines of force, the lines having a direction vertical to the planar plate and the sample surface.

25. (twice amended) A plasma etching system in accordance with claim 1, wherein the magnetic field generated by the magnetic field generating means has magnetic lines of force, the lines having a direction substantially vertical to the planar plate and the sample surface.

26. (twice amended) A plasma etching system in accordance with claim 1, wherein all or part of the surface of

the planar plate to be brought into contact with the plasma is coated with dielectric.

27. (twice amended) A plasma etching system in accordance with claim 26, wherein the dielectric covering all or part of the surface of the planar plate to be brought into contact with the plasma is quartz, aluminum oxide, silicon nitride, or polyimide resin.

C2 out

28. (twice amended) A plasma etching system in accordance with claim 26, wherein temperature of the dielectric is controlled to a fixed value in a range from 20°C to 250°C.

29. (twice amended) A plasma etching system in accordance with claim 1, further including a filter in a power supply path to supply the electromagnetic wave with a frequency ranging from 300 MHz to 500 MHz to the planar plate,

the filter allowing the high-frequency power applied to the sample to flow to the earth.

30. (twice amended) A plasma etching method for use with a plasma etching system in accordance with claim 1, comprising the step of applying the high-frequency power with a frequency ranging from 200 kHz to 14 MHz to the sample with a density of 0.5 W/cm^2 to 8 W/cm^2 to achieve surface processing of the sample.

31. (twice amended) A plasma etching system in accordance with claim 15, wherein the high-frequency power is applied to the ring-shaped member with a density of 0 W/cm^2 to 8 W/cm^2 in the surface of the member to be brought into contact with the plasma.

32. (twice amended) A plasma etching system in accordance with claim 1, wherein:

a height relative to the sample surface and a width of the magnetic field region associated with the electron cyclotron resonance condition generated between the planar plate and the sample by the magnetic field generating means are controlled; and

C2

radicals generated in the plasma is controlled.

33. (thrice amended) A plasma etching system in accordance with claim 3, wherein:

the vacuum chamber includes an upper section made of an insulating material;

the system further including, on an atmosphere side of the insulating material, a planar plate arranged via dielectric at an earth-potential; and

the electromagnetic wave is applied to the planar plate to generate plasma in the vacuum chamber through reaction between the electromagnetic wave and the magnetic field.

36. (twice amended) A plasma etching system in accordance with claim 34, wherein the member placed at a

C3

position facing the sample is made of quartz, aluminum oxide, silicon, silicon nitride, silicon carbide, or polyimide resin.

37. (twice amended) A plasma etching method for use in a plasma etching system in accordance with claim 1, comprising the steps of:

using a mixture of argon and C_4F_8 as the source material gas; and

etching a silicon oxide film under conditions that argon has a flow rate ranging from 50 sccm to 2000 sccm, C_4F_8 has a flow rate ranging from 0.5 sccm to 50 sccm, and the mixture has a pressure ranging from 0.01 Pa to 3 Pa.

C3 cnt

38. (twice amended) A plasma etching method in accordance with claim 37, further including the step of adding CO gas the mixture to etch a silicon oxide film, the CO gas having a flow rate ranging 50 sccm to 300 sccm.

39. (twice amended) A plasma etching method in accordance with claim 37, further including the step of adding oxygen gas to the mixture to etch a silicon oxide film, the oxygen gas having a flow rate ranging 0.5 sccm to 50 sccm.

40. (twice amended) A plasma etching method in accordance with claim 37, further including the step of adding CHF_3, CH_2F_2, CH_4, CH_3F hydrogen gas, or a mixture thereof is added to the mixture to etch a silicon oxide film, the gas added having a flow rate ranging 0.5 sccm to 50 sccm.

41. (twice amended) A plasma etching method for use with a plasma etching system in accordance with claim 1, further including the step of using C_2F_6, CHF_3, $C_3F_6O_5$, C_3F_8, or C_5H_8, C_2F_4, CF_3I, C_2F_5I, C_3F_6 gas to etch a silicon oxide film.

42. (twice amended) A plasma etching system, wherein CO gas is added to the gas of claim 41 to etch a silicon oxide film.

43. (twice amended) A plasma etching system, wherein oxygen gas is added to the gas of claim 41 to etch a silicon oxide film.

C3 cont

44. (twice amended) A plasma etching method for use in the plasma etching system in accordance with claim 1, comprising the step of:

using as the source material gas a mixture of argon and C_5F_8; and

etching a silicon oxide film under conditions that argon has a flow rate ranging from 50 sccm to 2000 Sccm, C_5F_8 has a flow rate ranging from 0.5 sccm to 50 sccm, and the mixture has a pressure ranging from 0.01 Pa to 3 Pa.

45. (twice amended) A plasma etching method for use in the plasma etching system in accordance with claim 1, comprising the step of:

using chlorine as the source material gas; and

etching a material of silicon, aluminum, wolfram, or a material primarily including silicon, aluminum, or wolfram under a condition that the gas has a pressure ranging from 0.1 Pa to 4 Pa.

46. (twice amended) A plasma etching method for use in the plasma etching system in accordance with claim 1, comprising the step of:

using HBr as the source material gas; and

etching a material of silicon, aluminum, wolfram, or a material primarily including silicon, aluminum, or wolfram under a condition that the gas has a pressure ranging from 0.1 Pa to 4 Pa.

47. (twice amended) A plasma etching method for use in the plasma etching system in accordance with claim 1, comprising the step of:

using a mixture of chlorine and HBr as the source material gas; and

etching a material of silicon, aluminum, wolfram, or a material primarily including silicon, aluminum, or wolfram under a condition that the mixture has a pressure ranging from 0.1 Pa to 4 Pa.

48. (twice amended) A plasma etching method in accordance with claim 45, further including the step of:

adding oxygen gas to the source material gas to etch a material of silicon, aluminum, wolfram, or a material primarily including silicon, aluminum, or wolfram.

49. (twice amended) A plasma etching system in accordance with claim 1, wherein methane gas, chlorine gas, nitrogen gas, hydrogen, CF_4, C_2F_6, CH_2F_2, C_4F_8, NH_3, NF_3, CH_3OH, C_2H_5OH or SF_6 is used as the source material gas to etch a material primarily including an organic substance.

50. (twice amended) A plasma etching system in accordance with claim 1, wherein the magnetic field generated by the magnetic field generating means is intensity of 100 gauss or less between the planar plate and the sample.

C3 cont

51. (twice amended) A plasma etching system in accordance with claim 1, wherein the plasma is generated without using the magnetic field generating means.

52. (twice amended) A plasma etching system in accordance with claim 5, wherein the second electromagnetic wave superposed to the planar plate is divided to obtain part thereof to supply the part to the sample.

53. (twice amended) A plasma etching system in accordance with claim 1, wherein the electromagnetic wave to generate the plasma has a frequency ranging from 200 MHz to 950 MHz.

54. (twice amended) A plasma etching method for use in the plasma etching system in accordance with claim 1, comprising the steps of:

using a mixture of Cl_2+BCl_3, $Cl_2+BCl_3+CH_4$, $Cl_2+BCl_3+CH_4+Ar$, $Cl_2+BCl_3+CHF_3$, $Cl_2+BCl_3+CH_2F_2$, Cl_2+BCl_3+HCl, $Cl_2+BCl_3+HCl+CH_4+Ar$, $Cl_2+BCl_3+N_2$, $Cl_2+BCl_3+N_2+HCl$, $Cl_2+BCl_3+CHCl_3$; and

C3 cont

etching material of silica, aluminum, wolfram, or a material primarily including silicon, aluminum, or wolfram under a condition that the mixture has a pressure ranging from 0.1 Pa to 4 Pa.

Please add the following new claims:

--56. A plasma etching system in accordance with claim 1, wherein the ring-shaped member has electrical power supplied thereto without supplying gas therethrough.

C4

57. A plasma etching system in accordance with claim 34, wherein the ring-shaped member has electrical power supplied thereto without supplying gas therethrough.

Sub D5

58. A plasma etching system for use with a surface etching apparatus in which in a vacuum chamber including vacuum generating means, source material gas supply means, sample setting means, and high-frequency power applying means, the source material gas is transformed into plasma to achieve surface etching of the sample, means for generating the plasma

including electromagnetic wave supply means and magnetic field generating means, comprising:

a controller for introducing the electromagnetic field from a planar plate disposed in parallel with the sample into the vacuum chamber, for setting a distance between the plate and the sample to a value in a range from 30 mm to one half of a smaller one of respective diameters of the sample and the plate, and for controlling a quantity of reaction between a surface of the planar plate and radicals in the plasma;

wherein the distance between the sample and the plate is maintained during plasma etching.

59. A plasma etching system in accordance with claim 58, wherein the planar plate has a diameter ranging from 0.7 times that of the sample to 1.2 times that of the sample.

60. A plasma etching system in accordance claim 58, wherein the electromagnetic wave to generate plasma has a frequency ranging from 300 MHz to 500 MHz.

61. A plasma etching system in accordance with claim 58, wherein the electromagnetic field generated by the electromagnetic field generating means to generate plasma has an intensity satisfying a condition for electron cyclotron resonance between the planar plate and the sample.

62. A plasma etching system in accordance with claim 60, wherein the controller for controlling the quantity of

reaction between the surface of the planar plate and the plasma is means for superposing an electromagnetic wave of a another frequency onto the planar plate, the electromagnetic wave being different from the electromagnetic wave of the frequency ranging from 300 MHz - 500 MHz.

63. A plasma etching system in accordance with claim 62, wherein the another frequency of the electromagnetic wave superposed to the planar plate ranges from 50 kHz to 30 MHz, and the frequency applied to the planar plate has a power of 0.05 W/cm^2 to 5 W/cm^2.

~~64. A plasma etching system in accordance with claim 58, wherein the means for making radicals incident to a surface of the sample uniform in quantity and type thereof is a ring-shaped member disposed in a periphery of the sample.~~

65. A plasma etching system in accordance with claim 64, wherein the ring-shaped member includes a surface to be brought into the plasma, the surface being made of silicon, carbon silicon carbide, quartz, aluminum oxide or aluminum.

~~66. A plasma etching system in accordance with claim 66, wherein the ring-shaped member is applied with high-frequency power.--~~